

intervening nodes had tendrils *without axillary buds*. Occasionally, but very rarely, two successive nodes would have axillary buds, in which case the lower one would be smaller, and have also a small tendril on the opposite side. *Ampelopsis Veitchii* had the same character. He had attempted to propagate this by using nodes from which the tendrils pushed as single bud-cuttings, but failed to get any development from the axils. He believed they had not a trace of a bud in even the most rudimentary state. It had been said, in Darwin's paper on motion in tendrils, that the gland on the end of the tendril did not develop itself until it approached the object it was to cling to. In *Ampelopsis Veitchii* they developed before this, in the shape of small globes, looking like rudiments of the same flower which ultimately appeared. In fact, tendrils here were incipient flower-branches, as any one could see by tracing the common *Ampelopsis hederacea* up to its final flowering condition, when, the axial growth ending in a terminal bud, instead of the usual lateral tendril, it seemed to erect itself and bear flowers. It would seem as if it were only the elongation of the axis, demanding and drawing to itself nutriment which would otherwise go into the tendril, which made it a tendril, and not a flower-shoot.

He did not, however, intend at this time to attempt any explanation of these series of observations. He thought there was nothing in any known law of phyllotaxis which would explain them, and that by following them up matters of much interest to botany might be evolved. But, as he might have more to say about it some day, and winter was approaching, he thought to call the attention of the Academy to the facts, so that those interested might examine them for themselves before the frost destroyed the specimens.—*Proc. Acad. Nat. Sc. Philad.* Sept. 20, 1870.

*On the Flowers of Aralia spinosa, L., and Hedera helix, L.*

By THOMAS MEEHAN.

The study of *Aralia spinosa*, L., affords some interesting facts which do not seem to have attracted the attention of other observers.

In Dr. Gray's indispensable 'Manual of Botany,' it is said to be "more or less polygamous." I have had many specimens under my daily observation this season, from the earliest opening till the last blossom appeared, and find that it is much more nearly monœcious than the above quotation would imply.

There are three different sets of flowers, corresponding to the thrice-compounded branchlets of the large panicle. When the flower-scape elongates, it seems suddenly arrested at a given point, and a very strong umbel of *female* flowers appears at the apex. A great number of secondary branches appear along this main one, and they also suddenly terminate each with an umbel of female flowers. From these secondary branches a third series appear; and these flowers are well filled with anthers that are abundantly polliniferous. The female organs of these flowers of the third class, however, are defective, as only a few bear capsules, and in these a large portion of the seeds have no embryos. The polygamous character is confined

to this third series of flowers, the first two having purely pistillate blossoms. In these there do not seem to be the rudiments of stamens.

The most remarkable part of this process of development is that the whole of this first series of female flowers should open so long before the male ones come that they fall unfertilized. Most part of the second series also fall, and the crop of seeds is mainly made up of a few of the last opening ones of the section, and the comparatively few hermaphrodite ones which are found in those of the third class. It is a matter for curious speculation what special benefit it can be to the plant to spend so much force on the production of female flowers too early to mature, and then producing such an immense mass of pollen to go utterly to waste.

It may not be amiss to note that in the common carrot the earlier strong umbels have often a male flower in the centre, and that, while the usual flowers are of a pure white, this one is of a crimson colour. In the central umbels of *Aralia spinosa*, and at times on spurs along the branchlets of the panicle, are similar-coloured processes, so small that their form cannot be made out by a common pocket lens. Our fellow member, Dr. J. Gibbons Hunt, makes them out, under the dissecting-microscope, to be vase-like forms with five minute reflexed segments, and with a small solid disk in the centre. It is interesting as evidently being a successful attempt of an abortive flower to simulate in some respects a real one of another character.

Examining also the flowers of the allied European evergreen ivy (*Hedera helix*, L.), I find similar laws of distribution of the sexes as in *Aralia spinosa*, with the addition of a somewhat different structure in the male from the female flowers.

In Europe the plant is described as often having a single umbel as a flower-spike. It is quite likely in these cases the flowers are hermaphrodite. In all the cases I have met with here, the inflorescence is a compound of several umbels—a terminal one female, and the lateral ones male, as in *Aralia*. But there are rudiments of stamens in the flower; and in occasional instances I find a filament developed, but never, so far, with any polliniferous anthers. The flowers of the central female umbel have rather longer and stronger pedicels than the lateral male ones. The calyx is united with the ovary for one half its length, and the latter much developed in the unopened flower. In the male the segments of the calyx are two-thirds free, and the petals are much longer than in the female flowers.

As in *Aralia spinosa*, the male flowers do not open until some time after the female ones, and not before some of the latter, impatient of delay, have fallen unfertilized.

I have so often and in so many varied ways demonstrated to the Academy that in plants the male element is a later and inferior creation, that it seems almost supererogatory to point out that these plants illustrate the same principle; but it is part of the record of what I believe to be unobserved facts in relation to these species; therefore I briefly allude to them.—*Proc. Acad. Nat. Sc. Philad.* Sept. 27, 1870.